SPICE Newsletter
August 2011

CORE SPICE DEVELOPMENT

NAIF's "work list" for expansion and improvement of the multi-mission SPICE system remains as large as ever. Two major efforts currently underway are completion of the Java Native Interface SPICE Toolkits (JNISpice) for all supported platforms, and completion of the tessellated shape model–part of the new Digital Shape Kernel (DSK) subsystem. (DSK will eventually also incorporate a digital elevation model capability.) Unfortunately neither of these efforts is close enough to completion for us to reliably predict a release date. (Alpha-test versions of both capabilities are already being used by a number of SPICE users.)

In partnership with the User Centered Design group at NASA/Ames NAIF is developing a web-based GUI interface to SPICE, provisionally named "WebGeocalc." With just a standard web browser a customer will be able to use sets of standard GUI widgets—drop-down menus, radio buttons, check boxes and fill-in fields—to select a computation of interest and provide the necessary data, including specification of kernels to use. Pressing the "COMPUTE" button will produce the desired results, including tabular output and optional graphics. The WebGeocalc server will normally be the NAIF server at JPL, but the system could be installed at other space agencies or on anyone's own computer. WebGeocalc can do traditional SPICE-like computations (compute parameter "X" at time T, or from time T1 to T2 with step size of t. It can also use the not-so-new "geometry finder" subsystem to find times, or time intervals, when a specified condition exists (e.g. occultation) or when a specified parameter (e.g. altitude) is at a specified value or within a specified range. NAIF expects to offer an alpha-test version of WebGeocalc to interested customers later this Fall; contact the NAIF manager if interested in participating.

NASA FLIGHT PROJECTS USING SPICE

NAIF's SPICE support for Mars Odyssey, Cassini, Mars Exploration Rovers and Mars Reconnaissance Orbiter continues. The DAWN mission began its exploration of asteroid Vesta in July, and SPICE support for Juno, launched on August 5, will begin shortly.

The Applied Physics Lab continues its SPICE support for MESSENGER, in orbit around Mercury, and for New Horizons, on its way to Pluto.

NAIF's SPICE support for EPOXI and Stardust/NExT is about done; NAIF is finishing up the official archives. (The EPOXI spacecraft is still operating and may be given yet another assignment, which cold involve further SPICE kernel production.)

The NAIF Team is busy organizing SPICE flight support for several new missions: Grail and Mars Science Laboratory and Grail all are scheduled for launch September 8 and November 25, respectively. SPICE kernels for GSFC's Mars Atmosphere and Volatile Evolution Mission (MAVEN), launching in 2013, will be produced by a consortium of JPL/NAIF, the MAVEN Mission Operations Center at GSFC, and the MAVEN Science Operations Center at the U. of Colorado/LASP.

Ames' Lunar Atmosphere and Dust Explorer mission (LADEE), launching in 2012, is also anticipated to produce SPICE kernels, although details are yet to be worked out.

SPICE will also be used on the Soil Moisture Active and Passive (SMAP) earth science mission, scheduled for launch in 2014.

Portions of SPICE are being or will be used on some NASA heliophysics and astrophysics missions.

INTERNATIONAL FLIGHT PROJECTS USING SPICE

SPICE operations on ESA's Mars Express, Venus Express and Rosetta missions continues, centered at the European Space Astronomy Center (ESAC) in Spain. Under a NASA Participating Scientist program NAIF is helping the Russian Space Agency to deploy SPICE in support of the Phobos Sample Return mission. Under a similar program NAIF was about to help JAXA with SPICE deployment and training in support of the Venus Climate Orbiter (Akatsuki) mission, which unfortunately did not achieve Venus orbit insertion. (We hope to provide such support a few years from now when a second try at VOI may be possible.)

FUTURE FLIGHT PROJECTS USING SPICE

A variety of solar system exploration flight projects are under consideration for future implementation by various space agencies. Budget pressures on all of these agencies makes the future a little murky at present, but NAIF hopes to help with future deployment of SPICE wherever there is interest. Candidate missions include the NASA/ESA Mars 2016 and Mars 2018 missions, ESA's BepiColombo mission, and the Luna-Resurs and Luna-Glob missions being jointly organized by Russia and India. Perhaps there are still others of which NAIF is not aware.

SPICE ARCHIVES

SPICE data generated by NASA's planetary missions are being regularly archived at the NAIF Node of the Planetary Data System (http://naif.jpl.nasa.gov/naif/data_pds_archived.html). (Through prior arrangement NAIF is also mirroring ESA's MEX, VEX and ROSETTA SPICE archives.) The other space agencies that are using SPICE have created (or likely will create) their own SPICE archives and data distribution systems.

NASA's Planetary Data System is working now to design the next generation archive system, called PDS4 (also known as PDS2010). Once those standards have been set NAIF plans to migrate all of its SPICE archives to the PDS4 standards/system. This will NOT change any of the kernel formats or contents, and thus will not affect how you use SPICE data. The change will result in a few changes to the meta-data used in cataloging archived SPICE data, and will also result in changes/improvements for accessing archived SPICE data through the PDS' central catalog system. (Access to SPICE data directly from the NAIF website will not change.)

SPICE TRAINING

As the number of SPICE users increases, and as SPICE capabilities grow, offering SPICE training seems an important piece of NAIF's work. NAIF's current offering is a single, one-size-fits-all class. NAIF has come to realize–in part based on feedback from students–that this approach must change. In the future we hope to offer two official classes–one for beginners and a second for advanced users. (We must also offer training for both mission SPICE producers and for mission SPICE archive generators; this will happen in informal, one-on-one or few-with-a-few settings.)

The next domestic class is scheduled for September 13-15 inear Pasadena California. Unfortunately we have not been able to restructure the current "one-size" class syllabus. We'll try to host a new, advanced class in 2012.

In past years we have managed to work out arrangements to host SPICE classes at several locations outside of the U.S., sometimes using NASA funding and sometimes using host country funding. But at this moment no such classes are under consideration.

NAIF is interested to hear anyone's thoughts on SPICE training: what kind, when and where. Send any suggestions/requests to charles.acton@jpl.nasa.gov.

PROGRAMMATICS

The recently released NSF/NASA-sponsored National Research Council's DECADAL Report on solar system exploration (http://solarsystem.nasa.gov/multimedia/download-detail.cfm?DL_ID=742 , page 314) contains an endorsement for continued use of SPICE on NASA's planetary missions.

The International Planetary Data Alliance (IPDA) (http://planetarydata.org/) currently "recommends use of SPICE for ancillary data." The treatment of ancillary data, such as provided by SPICE, may be further discussed at the IPDA's annual Steering Committee Meeting on September 14-16.

Despite budget challenges and overall economic uncertainty, NASA has recently confirmed its financial commitment to NAIF. One consequence is that NAIF hired

a new team member, Samantha Krening. "Sam" as she is called recently graduated from the University of Colorado with a Master's degree in Aerospace Engineering Sciences.

YOUR SUGGESTIONS?

Should you have suggestions for improving NAIF operations or the SPICE system, we're interested in hearing of these. (charles.acton@jpl.nasa.gov)

If you wish to subscribe or unsubscribe from the "spice_announce" Mailman list, visit: http://naif.jpl.nasa.gov/mailman/listinfo/spice_announce/